World Health Network

Paths to Healthy Learning

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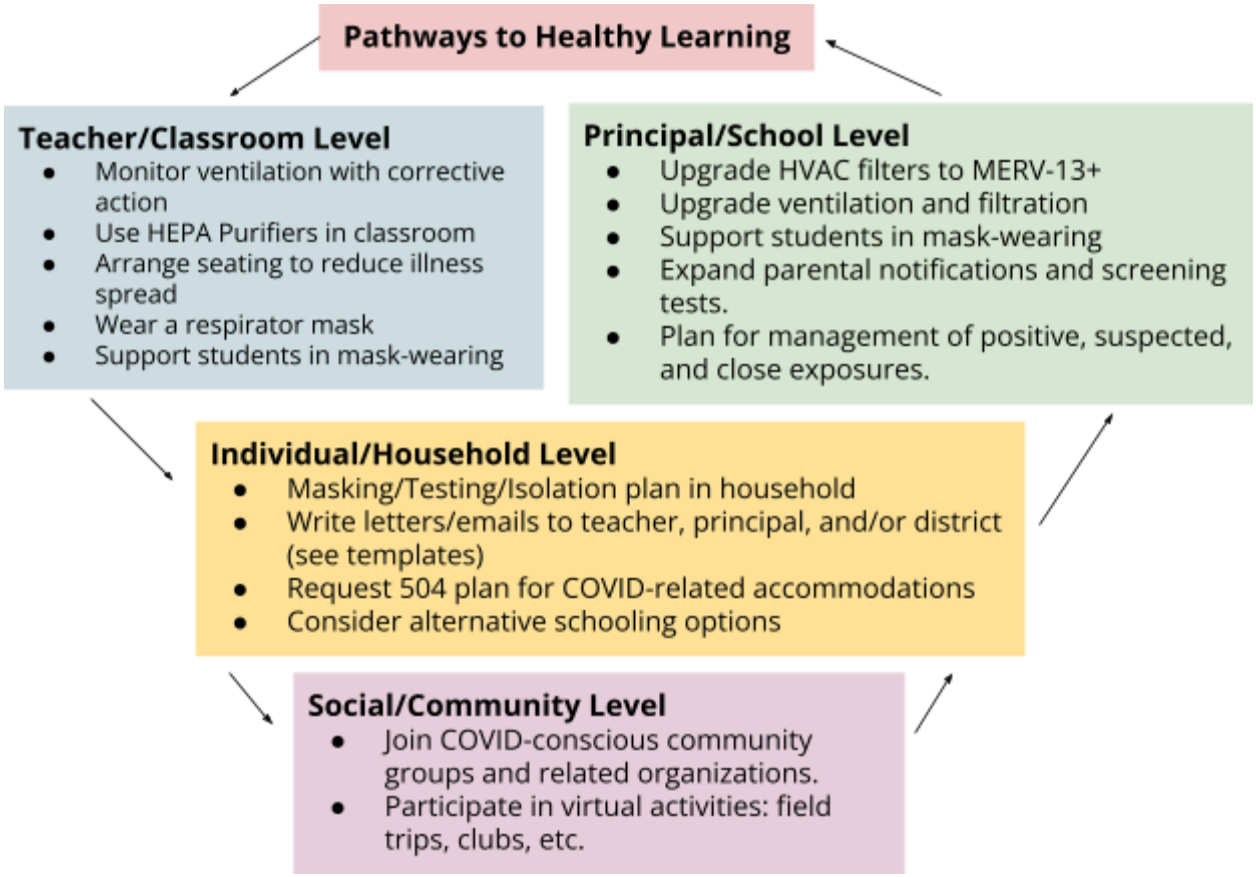
Steps can be taken at Teacher/Classroom, Principal/School, Individual/Household, and Social/Community levels to reduce the risks that COVID-19 poses to the health of students, staff, and their households.

All children and staff deserve a safe learning environment. COVID is airborne—it is spread by infectious aerosols when sharing air. Here are the steps that educators, parents, students, and community members can take to provide safe learning environments.


Pathways to Healthy Learning
Teacher/Classroom Level
Monitor ventilation with corrective action
Use HEPA Purifiers in classroom
Arrange seating to reduce illness spread
Wear a respirator mask
Support students in mask-wearing
Principal/School Level
Upgrade HVAC filters to MERV-13+
Upgrade ventilation and filtration
Support students in mask-wearing
Expand parental notifications and screening tests.
Plan for management of positive, suspected, and close exposures.
Individual/Household Level
Masking/Testing/Isolation plan in household
Write letters/emails to teacher, principal, and/or district (see templates)
Request 504 plan for COVID-related accommodations
Consider alternative schooling options
Social/Community Level
Join COVID-conscious community groups and related organizations.
Participate in virtual activities: field trips, clubs, etc.

The following guide was put together by WHN's School Safety Team. It uses recommendations from the CDC [1], White House [2], EPA [3], and ASHRAE [4], all of whom acknowledge that COVID-19 travels in aerosols that can linger and build up indoors, making the risk of infection in indoor buildings such as schools extremely high unless actions are taken to reduce risks.

Steps to take at the Teacher/Classroom Level

Indicators of a Healthy Classroom

1- Good ventilation starts with assessing CO2 levels in a classroom using a CO2 Monitor [5] (such as an Aranet 4 [6]). CO2 reflects the amount of exhaled breath in a room, and it is a proxy [7] for transmission risk [8] of COVID-19 and other airborne pathogens. In addition, high CO2 harms health and has negative impacts on learning [9].

a. Calibrate the CO2 monitor as needed per manufacturer's instructions. Place it away from windows and walls in a place where it can be monitored, such as on a teacher's desk (but not in direct line of exhaled breath). Monitor it while the room is at its normal capacity for the full school day.
b. Take action by opening windows when the CO2 monitor reads higher than 800 ppm (CDC's standards [1]) or 1000 ppm if air purification strategies are employed [10], indicating that the room is not adequately ventilated. The teacher can improve ventilation by opening windows [11]. Even opening the windows just 6 inches, or airing out for 5 minutes each hour can improve ventilation.

2- Add HEPA or DIY air cleaners to reduce COVID-19 risks. Air cleaners help capture viruses, bacteria, and allergens circulating in the room. True HEPA [12] and/or DIY Corsi-Rosenthal Box (CR Box) [13] (DIY video [14]) air cleaners reduce COVID-19 risks when they:

a. Provide the equivalent of 8-12 ACH (air changes per hour) [15], aiming toward 12 or more, since classrooms are considered higher density spaces (*see ASHRAE Draft Summary [16] Update*

b. Clean Air Stars [17], Rochester CADR Calculator [18], Smart Air CADR/ACH Calculator [19], or OHCOW Ventilation Calculation Tool [20] are helpful tools to determine your ventilation and purification needs, or:

c. Use the formula below to determine Total CADR, or Clean Air Delivery Rate, needed for your space in order to get 12 ACH from HEPA purification and/or CR Boxes:

Total CADR needed (*in cubic feet per minute, or cfm*) =

[(LxWxH of room in feet) ✖ (12 ACH)**]** ➗ 60

*For example, a classroom that is 30x30x10 feet will need **1800 CADR** to achieve 12 ACH**,** which may be achieved by two extra large room HEPA purifiers (400-500 cfm), and a CR-Box (600-800 cfm), along with opening windows 6 inches or periodically (100-300 cfm). Good ventilation reduces these requirements by the cfm it provides.*

d. A HEPA purifier's CADR is listed by their model/manufacturer—use the smoke CADR metric. If the air purifier's CADR is listed in cubic meters per hour (*cmh*), multiply the CADR by 0.589 to get the CADR in cfm (the common US metric). Note: a higher capacity purifier may be needed than specified by the manufacturer.

e. A CR-Box [13] CADR varies depending on the components used. For example, one made with four 2 inch MERV-13 filters using a Lasko 20-inch box fan has a CADR of 600-800 cfm (600 cfm at lowest speed, and 800 cfm at highest speed).

f. The combined total of your individual HEPA purifiers and/or CR-Box's CADR (using the CADR for when it is run at the speed acceptable for noise tolerance) should equal or exceed the calculation for Total CADR needed for your space.

g. Place the air cleaners in a manner that allows airflow from all sides (at least 1 foot from walls). Place on opposite sides of the room, at least 3 feet from the nearest occupant.

3- Masks [21] are recommended by CDC [1] for children ages 2 and up to wear in school to help keep them healthy and prevent the spread of infections in the classroom.

a. While cloth and surgical masks do limit airborne spread, their effectiveness is very poor. They should only be used when respirators are not available.

b. Respirator masks, including well fitting N95, KF94 and FFP2 masks, are much more effective than surgical or cloth masks, and are available in child sizes [22].

4- Arrange seating to reduce the spread of COVID-19 in the classroom by:

a. Spacing out seating as much as possible.

b. Not placing desks in clusters with children facing each other.

c. Not installing plexiglass barriers, as these can lead to a build up of viral particles.

5- Reduce Exposures. For Positive, Suspected, and Close Exposures in the Classroom:

a. If there is a symptomatic child in the classroom, send the child to the nurse: malaise/ fatigue, sore throat, coughing, sneezing, congestion, runny nose, cold sweats, fever,

chills, itchy red eyes, nausea, vomiting, diarrhea, loss of smell and/or taste, and/or looking unwell [23].

b. Call 911 for severe symptoms such as difficulty breathing. Severe symptoms include: trouble breathing; persistent pain or pressure in the chest; new confusion; inability to stay awake or be roused; pale, gray, or blue-colored skin, lips, or nail beds, compared to their usual complexion; and/or sensory deficits (loss of sight, hearing) or motor (loss of limb control, speech disturbances)[23].

c. If you become aware of a suspected or positive case in the classroom, notify the school nurse or administration so they can implement policies regarding informing close contacts, screening, and isolation.

6- Encourage good hygiene practices in the classroom, such as: covering coughs; sneezing into the elbow or pulling the shirt up over the nose and sneezing into it; using and properly discarding tissues; and using sanitizer or washing hands after they become soiled and before eating. Have tissues, sanitizer, and child-size respirator-masks (N95/KF94/KN95) [21] available. While aerosols are the primary way COVID-19 spreads, surface contact (fomite) spread is also possible for COVID-19 and other disease transmission, so soiled or high contact surfaces should be disinfected. Avoid using spray products that contain toxic ingredients which can be airway irritants [1].

7- Use Teacher's Checklist (see example below) to assist in a routine that works for your classroom. Reach out to school to identify or approve assistance from volunteers, student helpers, or maintenance staff.

Teacher/Classroom Level: Example Teachers Checklist

At Beginning of Day:

- ❏ Turn on HEPA Purifier/CR-BOX to the highest setting before classes begin (may also set on timer).
- ❏ Ensure CO2 monitor calibration is up to date, and that the unit is operational and properly placed.
- ❏ Open windows (if/when possible) for as long as possible during class while maintaining an appropriate temperature. Even opening a small crack, if only for five minutes each hour, can improve ventilation, reflected in improved CO2 readings.

During Class:

- ❏ Keep HEPA/CR-BOX to a setting where sound-tolerance is acceptable and meets the 8-12 ACH (within this range, run at lower levels during quiet times like during tests, and higher levels at more active times, or install more purifiers and run at lower quieter levels).
- ❏ Keep an eye on the CO2 monitor to ensure it remains no higher than 800 ppm. If it exceeds 800, open windows (if possible), mechanically ventilate using exhaust fans, and/or run purifiers on highest levels.

At Breaks:

- ❏ Open windows during classroom breaks, if possible.
- ❏ Run all HEPAs and/or CR-BOXes on highest settings.

At end of day:

- ❏ After class, run all HEPAs and/or CR-BOXes at highest settings until the last occupant leaves for the day, then turn off. Timers may be used where available.

Maintenance:

- ❏ Wear an N95 mask, gloves, and eyewear for protection when cleaning or maintaining filters. Old filters are to be bagged and disposed of with regular trash.
- ❏ Maintenance staff may need to vacuum, wash or replace HEPA pre filters per manufacturer instructions. Schools should have replacement HEPA filters on hand, to be changed when HEPA indicator light is on or when needed (e.g., visible buildup of dust or particles so that the HEPA filters look gray or dirty, or reduced airflow).
- ❏ CR-BOXes will need to be reassembled with new filters [13] 1-2 times a year. Fans are to be checked that they are working properly, and then they may be reused.
- ❏ Infographic W.A.T.C.H. How You Can Clean the Air / Hi Res PDF of the Poster [24]

Steps to Take at the Principal/School (and/or District) Level

Indicators of a Healthy School

1- Clean the Air: Upgrades to ventilation and purification in schools are recommended by the CDC [1], EPA [25], ASHRAE [4], ASHRAE Industrial Settings [16], and the World Health Network [10] to reduce risks of COVID-19 in schools.

a. Use CO2 monitors to assess ventilation needs and keep below 800 ppm (CDC's [1] standards) or 1000 ppm if air purification strategies are employed [10], with plans for action when higher readings occur (i.e. opening windows, turning portable purifiers on high, and/or using the HVAC method described below). Add mechanical ventilation if readings cannot be kept below 800-1000 ppm. Research [26] shows that higher ventilation in schools significantly reduces illness-related absences.

b. HVAC Method [27] : Upgrade to MERV 13 filters (or higher efficiency) in HVAC systems [4], have the fan running constantly— even when heat or AC is not in use, as soon as spaces are occupied— by keeping the fan turned ON [28]. Maximize outside air intake and reduce recirculation of air as much as possible in the occupied spaces. The level of outside air intake (Air Change per Hour, ACH) should not be reduced even when using other increased ventilation effectiveness strategies. Flush spaces between occupied periods for a duration of at least 2 hours to reduce concentration of airborne infectious particles by over 95%. This allows for air flow resistance by room shape and furniture and assumes ventilation at a level of 3 changes of air per hour (or equivalent outdoor air including the effect of filtration and air cleaners)[4]. *See ASHRAE Design Guidance for Education Facilities for further details [29].*

c. Supplement ventilation with HEPA air purification and/or DIY CR-BOXes [13] in order to obtain 8-12 ACH (air changes per hour) or higher *[16]. See "Steps for Teachers" section for more information regarding determining ventilation and purification needs* and *EPA Info on HEPA Purification and Maintenance [25].*

2- De-densify spaces (i.e. space out seating, lower capacity, create outdoor options) especially for snacks/lunches. *See: Modifying School Spaces During Mealtimes [30] for more info. See Simple safety measures reduce musical COVID-19 transmission [31] for band practice safety tips.*

3- Implement Masking Policies and Recommendations. Develop a school-wide plan that indicates under what conditions masks will be required [32] or at least strongly recommended (at all but very low transmission levels, or absent effective monitoring, WHN recommends

masking), with:

a. Recommendations for and access to N95/equivalent respirator masks [21], including child-sized KF94s or KN95s [22], which significantly reduce transmission in schools [34] [35], *irrespective of local epidemiological situation* (WHO 2023 updated guidance [36]).
b. Parental and staff notifications sent out when local waste water data is high.
c. Parental and staff notifications sent out when illness absence levels at the school are above a certain percent (lower than influenza outbreak standards of 5-10% for staff and/or students [33]).
d. Creation of spaces where universal masking is required in order to provide accessibility to students and staff who need universal masking accommodations [37].

4- Have A Plan for Symptomatic, Positive, Suspected, and Close Exposures:

a. Having on-site rapid molecular testing and/or surveillance pooling tests available will help prevent the spread of COVID-19.

b. Provide or recommend screening [38] or diagnostic testing [10], for symptomatic, suspected, and close exposures.

c. Diagnostic Testing involves using PCR, LAMP, or RAT (Rapid Antigen) tests to identify a positive case [10].

d. If there is a positive case, notify close contacts (classroom, bus, extracurriculars).

e. Require 14 day isolation period [41] for confirmed positive individuals, and require (or at least strongly recommend) isolation for suspected cases.

f. Recommend close exposures to quarantine or at least wear a well-fitted respirator mask [34] for a *minimum* of 10 days.

5- Consider regular screenings or surveillance testing [40], one of the best preventive measures:

a. Daily screenings: Each staff and student takes a quick screening questionnaire [38] to identify symptomatic individuals for testing.
b. Surveillance testing: Daily gathering of pooled samples for PCR or lower cost LAMP testing [40]. For a positive pool, use individual tests (PCR or LAMP) to determine who is infected.

Principal/School Level- Funding and Resources

How to Get Funding for HEPA Purifiers and Ventilation Upgrades

1- Federal Government Funding in the US: The American Rescue Plan provided $350 billion for state and local governments [42], as well as $122 billion for schools [43], that can be used to support making ventilation and filtration upgrades. ESSER I funding has expired, ESSER II [44] federal funding expires on **September 30th 2023**, and ESSER III [45] expires on **September 30th 2024**.

2- Grants in the US: Department of Energy Funding [46] has grants for air quality improvements and infrastructure upgrades at public schools available.

3- US States with Programs for Funding for HEPA Purifiers in Schools include Illinois [47], Colorado [48], New Jersey [49], Utah [50], and Oregon [51] (not a comprehensive list; check/appeal to your state for more information)

Supplemental Resources:

1- Addressing Indoor Air Quality in Schools Toolkit | National Education Association [52]

2- Indoor Air Quality in Schools Guide | American Lung Association [53]

3- New Center for Green Schools Report on Indoor Air Quality in our Schools | U.S. Green Building Council (usgbc.org) [54]

4- Healthy Schools Network | National Healthy Schools Day & NHSDay press 4-3-23 final web.pdf (dropbox.com) [55] Healthy Schools Network (press release here lists multiple organizations supporting clean air in schools!)

5- **Create A Game Plan to Reduce COVID-19 Ris**k- Webinar: EPA [25]

6- CDC [56]: On April 7th, 2023 the CDC released a report on ventilation in schools, showing that many schools have yet to take action to improve ventilation. This is despite the fact that substantial federal funding remains available for ventilation improvements in school buildings; and that these improvements have been shown to reduce COVID-19 transmission, other airborne infectious diseases, asthma exacerbations, and allergy symptoms; as well as being linked to better academic outcomes for students. Ventilation improvements can improve infectious and noninfectious disease outcomes for students and staff members.

Steps to Take at the Individual/Household Level

How to Keep Your Household Healthy

1- Wear appropriate masks [21] when around others not in your household. N-95s, KF94 and KN95s (which are available in child sizes [22]), or better masks are recommended, as they offer the highest level of protection.

2- Stay home when a student is symptomatic, awaiting test results, or has tested positive for COVID-19. Close exposures are recommended to screen [38], use diagnostic testing [10], and/or surveillance testing [40] while actions for isolation are taken [41]— such as positive cases isolating for a minimum of 14 days, and suspected cases quarantining or masking in public settings for a total of 14 days. *See Multilingual screening tool [57]* for more details on screening. *See #4 on Steps to Take at School Level* for more information on testing.

3- Write emails/letters to the classroom and school to help initiate changes to make your school into a healthy learning space. ***See WHN's Email/Letter templates written to educators here [58].***

4- Create a 504 Plan for your Student and email to the principal or district.

a. Section 504 is a legal protection that the CDC and US Secretary of Education say can be used specifically for adding Covid-19 precautions for vulnerable students, or students with vulnerable family members, citing that **students and their households may need additional protections to ensure the student can remain safely in the classroom.** To comply with their Federal non-discrimination obligations under Section 504, school districts must make reasonable modifications when necessary to ensure equal access for their students, absent a showing that the modifications would constitute a fundamental alteration or undue administrative burden to the program. *See **WHN's Guide to Section 504 Accommodation Plan [59],*** for more information on 504 plans for COVID-19 accommodations. For general information on 504 plans *see AAFA's 504 Plan Guide [60]*. For more information regarding making a universal masking accommodation request, *see Seaman v. Virginia [37].*

5- School staff members can submit requests for reasonable accommodations for COVID/Long COVID using the following guides:

a. Supporting Employees Guide [61] by Job Accommodation Network
b. Services and Supports For Longer Term Impacts of Covid 19 [62] by Department of Health and Human Services

6- Seek Educational Alternatives

a. Seek alternate public or private schools that WILL accommodate, or enroll in a public virtual school, in which the child attends from home (assisted by parent/caretaker) with curriculum/instruction provided virtually by the state.

b. Register with the county as a homeschool student and develop a home education plan.

Individual/ Household Level: Homeschool vs. Virtual Public School

Homeschooling vs. Public Virtual Schooling		
	Homeschool	Public Virtual School
Primary Educator	Parent(s) are responsible (may use certified teachers and/or tutors if you'd like). Free and paid curriculum options are available.	Teacher is responsible (often needs a parent to be a designated learning coach). Follows state curriculum.
Learning Environment	Home/your choice.	Computer/internet needed.
Register with County As	Register with your state/county [63] as a homeschool student.	Remain a public school student at a public virtual school.
Requirements:	States vary, but typically annual homeschool evaluation, may be done virtually, see the state regulations for details [64].	Testing requirements vary by state. Some may require in-person state testing, call about accommodations.

Individual/ Household Level: Alternative Educational Options

Although WHN does not endorse any specific institution, below is a list of information and resources to assist in your search for a safe alternative education option.

<table>
<tr><th>Public Virtual School</th><th>Free Homeschool Virtual Curriculums</th><th>Paid Homeschooling Curriculum and Supplemental Social Resources Examples</th></tr>
<tr><td>Available in most states and at all grade levels Kindergarten-12th

Free:
Connections Academy [65]

Tuition or Scholarship:
K12 Private Academy [66]</td><td>Free Virtual Homeschool curriculum for K-12:
Khan Academy [67]
CK-12 [68]
Easy Peasy [69]

Free Virtual Homeschool Co-ops:
Kind & Curious [70]

Free textbooks:
Wiki Books [71]

Higher Education Resources:
Open Educational Resources [72]</td><td>Curriculum available virtually with paid subscriptions and/or pay by class):

Acellus Academy [74] (private virtual, all levels, full academic)
Blossom and Root [75] (supplemental homeschooling curriculum k-5th grade
Brain Pop [76] (supplemental curriculums at all school levels; videos, quizzes)
Montessori Virtual Programs:
- PreK-5th grade [77]
- 6-12th grade [78]
Time for Learning [79] (K-12)

Workbooks:
BrainQuest [80],
Grade Level Bundles [81]
Curriculum Store [82]

Online Tutoring: Tutor Eye [83]</td></tr>
<tr><td colspan="2">Database [73] curriculums/ programs listed by State: (some are free homeschool options with teacher and curriculum support but flexible, and others are free public virtual options; This is not a comprehensive list).</td><td>Supplementary virtual classes, clubs, tutoring, and socials for school-aged children:
Outschool [84] (US-based)
Allschool [85] (International-based)

Heart and Minds [86] in person COVID-cautious community educational programs.</td></tr>
</table>

Steps to Take at the Social/ Community Level:

How to Support and Be Supported By Your Community:

There is a substantial number of COVID-cautious individuals and families, and this number continues to grow daily. Connecting with others with similar precautions can be helpful.

COVID Meetups [87]

1. Allows families to connect with other families and find children with similar ages, interests, and COVID-precautions to connect with each other for virtual or in-person meetings. Has group discussion pages as well: https://www.covidmeetups.com/

Facebook Groups: There is a large number of "Still COVIDing" Groups on Facebook, examples include the groups below. We recommend you search your local area, as well as join these supportive groups to find helpful resources and like-minded individuals.

1. **Still COVIDing Parents Edition [88]**- Has a KIDS connection optional subgroup that kids can join to connect with other kids. Some parents are doing regular school and some homeschool in this group, and different people have different levels of precautions.

2. **Still COVIDing Homeschool Edition [89]**- Fun to share info and feel more connected as a homeschooling family with others who are still COVIDing.

Virtual Field Trips/Tours/Activities/Camps:

1. National Zoo Virtual Field Trips [90]
2. Virtual Museum Tours [91]
3. Virtual Art Museum Tours [92]
4. Virtual Science Activities [93]
5. Connected Camps [94]

Organizations

1. **World Health Network [95]:** Website is whn.global to learn more, and to join the network.

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